

ECONOMICS

Record profits for business giants



This country's turnover giants broke all profit records last year. Combined turnover of companies with sales exceeding 1,000 million deutschmarks increased by 8.7 per cent to just over 500,000 million marks, with profits (after tax but before reserves were set aside) up nearly 100 per cent from 6,800 to a little over 12,000 million deutschmarks.

accounted for nearly ninety per cent of foreign construction contracts - a total of roughly 12,300 million deutschmarks. Several leading companies are again not listed because they prefer not to disclose trading figures. They include, for instance, Beteiligungs and Coca Cola. What they hope to gain from this reticence is hard to see; it is a mystery even to their competitors.

Other companies, such as Deutsche Marathon Petroleum, were not listed despite turnover in this firm's case of 1,500 million deutschmarks, the reason being that they are mainly traders, not manufacturers. Classification according to turnover presents problems in any case, with published figures varying substantially from one publication to another. Turnover can be defined in a number of ways.

The top 100 firms in this country

Table with columns: Ranking, Company, Industry, 1976 turnover, 1977 turnover, etc. Lists top 100 firms like Thyssen, Siemens, Hoechst, etc.

Top ten trading companies table with columns: Rank, Company, 1976 turnover, etc. Lists Thyssen Handelsunion, Stinnes, etc.

The two trading divisions of large groups in the top ten came first and second. Raab Keller, Veba subsidiary, as is Stinnes, totalled DM7,043m in turnover last year but came eighth on deduction of DM1,384m in oil duties. For the same reason Aral, whose turnover including oil duties totalled DM18,953m and would have rated third place, came fifteenth, trailing behind H&M, Aldi and Rewe-Zentrale.

Top ten employers table with columns: Rank, Company, 1976 employees, etc. Lists Bundespost, Bundesbahn, Siemens, etc.

At the end of last year the top ten employers between them employed a payroll of 2.39 million, nearly ten per cent of the country's workforce. This figure was down marginally, by 36,174, on the previous year. But these figures are slightly misleading inasmuch as many firms include foreign and overseas staff. The Bayer group, for instance, employs 171,200 people all over the world but only 64,336 in this country. AEG-Telefunken, on the other hand, employ only 30,100 but abroad. The increase in Siemens' payroll is due to the takeover of Gamm.

Large table listing 100 companies with columns: Rank, Company, Industry, 1976 turnover, etc.

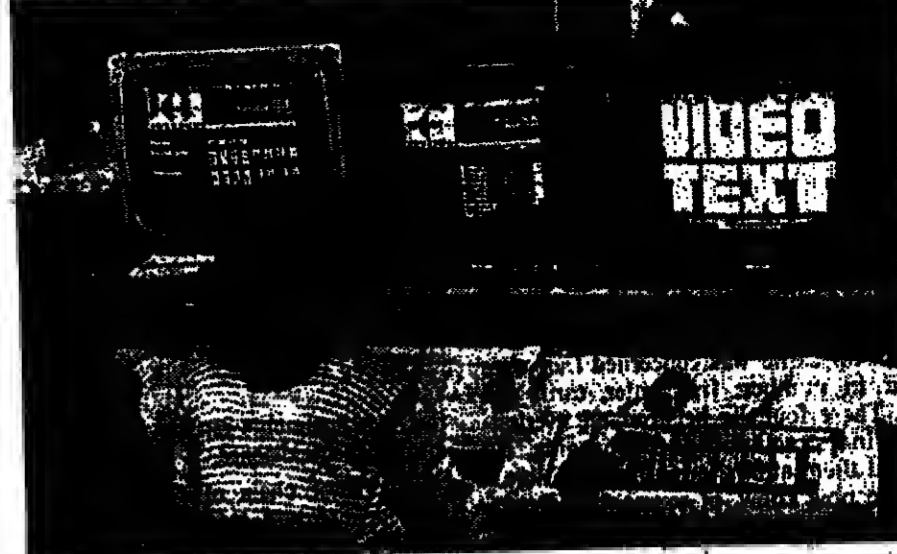
TECHNOLOGY

All the latest in sight and sound at the Berlin radio show



Never before has Karl Mende, the country's second-largest manufacturer of TV sets, exhibited so many new models at a Berlin radio show. Yet the two that are probably most important are not for sale. One is a colour TV set with a built-in micro-computer; this is a model he intends to manufacture, but he is not yet sure when.

channels, whereas Blaupunkt and Siemens only handle nineteen, but with only three programmes from which to choose in most parts of the country this may hardly be felt to matter. Other manufacturers have resurrected the idea of a picture within a picture, an inset that flashes into one corner of the screen to indicate what is on the other channels. This idea was tried out without much success four years ago, and not all manufacturers have joined the bandwagon. There are colour receivers with up to three additional black-end white screens, but some manufacturers feel a swift remote-control change from one programme to another is sufficient. The picture within a picture is certainly an expensive extra. The difference in price is so great that a second set, a black-and-white portable, could be bought for the cost. There is an unmistakable trend towards smaller, 46 and 56-centimetre screens, while 1977 models on average use only half the power consumed by TV sets of a decade ago. By and large the introduction of module components has made sets less prone to break down. According to one manufacturer 25 repairs now need carrying out on 100 sets sold within twelve months of sale.



A Videa-text display at the show (Photo: dpa)

presented difficulties in respect of cassette tape decks. Hi-fi tape decks call for such complex electronics that they cost much the same as conventional tape recorders of comparable quality (which is easier to achieve with higher tape speeds). Cassettes, however, are easier to handle. Japanese manufacturers are trying to launch a larger cassette which runs at higher speeds. The quality is undeniably better, but then the price is higher. The new cassette has probably arrived too late to gain a significant share of the market. Stereo devices with separate tuner, speakers and record deck are growing increasingly up-market. In the medium and lower price-brackets combined record-players and radio or tape decks are gaining the upper hand. The reason is, or so it would seem, that more and more customers are growing tired of the festoons of wiring needed to link up the various components. Most manufacturers still provide quadrophony, but under the counter only, as it were, and few customers bother to enquire, which is, perhaps, hardly surprising.

The broadcasting authorities are partly to blame, since quadro transmissions are the exception rather than the rule and usually undereken by accident rather than by design. What is more, however, there are too few quadrophonic records and tapes available to make quadro particularly attractive, and many people who have invested in quadrophony are disappointed because it has not lived up to expectations. For the time being broadcasters expect to remain in the stereo camp.

No one would deny that the main purpose of the radio show is to boost sales. Fifty per cent of households in this country have colour TV sets, and nearly everyone has hi-fi or stereo equipment.

Only a few years ago the corresponding figure was 100 out of 100, which does not, of course, mean that each and every set went wrong at some stage within a year of purchase; some needed repairing more than once.

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Incorporation of a micro-computer in colour TV sets is unquestionably a major advance. Karl Mende may wonder whether he has not been too ambitious, but Blaupunkt and Siemens are already marketing micro-computer models. Market saturation, says Blaupunkt's Dr Siegle, necessitates a wider range of models, and computerisation marks a new departure in comfort at the upper end of the range.

The major manufacturers' respective ranges certainly testify to a difference in outlook. Blaupunkt and Siemens sell sophisticated models requiring a degree of familiarity with the operating instructions, whereas Nordmende apparently have less confidence in their customers. Nordmende sets are certainly easier to programme, but at the same time less versatile. Electronic programme selection is limited to nine options that can be preset no more than 24 hours in advance. Blaupunkt and Siemens micro-computerised sets, on the other hand, can store up to twenty commands given up to a year in advance or repeated daily until such time as the instructions are cancelled.

When Blaupunkt and Siemens sets are programmed an electronic device must first scan the available channels to locate programmes. The Nordmende set does not require this additional feature. If you know what channel local transmissions are screened on you can dial it direct. With the Nordmende receiver viewers can dial by remote control up to 29

channels, whereas Blaupunkt and Siemens only handle nineteen, but with only three programmes from which to choose in most parts of the country this may hardly be felt to matter. Other manufacturers have resurrected the idea of a picture within a picture, an inset that flashes into one corner of the screen to indicate what is on the other channels. This idea was tried out without much success four years ago, and not all manufacturers have joined the bandwagon. There are colour receivers with up to three additional black-end white screens, but some manufacturers feel a swift remote-control change from one programme to another is sufficient. The picture within a picture is certainly an expensive extra. The difference in price is so great that a second set, a black-and-white portable, could be bought for the cost. There is an unmistakable trend towards smaller, 46 and 56-centimetre screens, while 1977 models on average use only half the power consumed by TV sets of a decade ago. By and large the introduction of module components has made sets less prone to break down. According to one manufacturer 25 repairs now need carrying out on 100 sets sold within twelve months of sale.

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SCIENCE

Scientists discuss structure of matter at Hamburg symposium

About 2,300 years ago Democritus, the Greek philosopher, hit on the idea that everything around us might be made up of a few basic elements.

As far as he was concerned they were four in number: fire, water, earth and air. These four, he believed, are everlasting, indestructible and unchanging. He called them atoms, meaning indivisible.

We now know, of course, that Democritus' four elements are not the last word on the subject. They are not indivisible. All that remains of his idea is the word atom.

And even the atom can no longer be regarded as indivisible and has not been since the discovery of nuclear fission by Otto Hahn, a German chemist.

Yet oddly enough there was still talk of the four basic elements of matter at a recent international congress of physicists in Hamburg. Nowadays, however, they are not atoms, but quarks.

More than five hundred scientists from thirty countries spent a week discussing research into the basic structure of matter. They were in Hamburg for the International Symposium on Lepton and Photon Interaction at High Energies, which is held every other year.

Maybe it would be as well to start with a thumbnail sketch of what has been happening recently as far as scientists specialising in elementary particle research are concerned.

Scientists have known since the early years of this century that the atom consists of three different kinds of smaller particles: electrons, protons and neutrons.

Electrons orbit the nucleus like planets orbit the Sun, while the nucleus itself is composed of positively-charged protons and neutral neutrons.

For years physicists have been trying to discover whether these atomic particles, which between them account for virtually the sum total of matter, are not in fact made up of yet smaller particles.

In 1962 a US scientist, Murray Gell-Mann, published his theory that these smaller particles do exist. He reckoned there are three kinds of what he called quarks, an artificial word he borrowed from James Joyce's *Finnegan's Wake*.

In 1969 Professor Gell-Mann was awarded the Nobel physics prize for his theoretical work on the subject, but his theories have yet to be scientifically proved as fact.

It was obvious at Hamburg, however, that few, if any, leading physicists doubt the existence of quarks any longer. Over the past three years the pattern of evidence has grown so closely interlinked



that few arguments can be advanced to dispute their existence.

This latest chain of research began with a discovery made in November 1974 by two other American physicists, Samuel Ting and Burton Richter.

Their discovery seemed to run counter to Gell-Mann's theory inasmuch as it necessitated the addition of a fourth quark, which was dubbed "charm."

But the more the physicists came to learn about charm, the more they felt it bore out Gell-Mann's theory except in one single respect, that there are four quarks, not three.

The final link in the chain of evidence available to prove the existence of "charm" was one of the three outstanding research results made public at the Hamburg conference.

Physicists working at the city's electron synchrotron, a particle accelerator known as DESY (which in German is pronounced "Daisy"), have discovered what is known as the F meson, a particle which is phenomenally difficult to prove exists and consists of a charm quark and

a strange quark (which are two different kinds of quark).

The combinations of charm quarks and the other two varieties, which are known as up and down quarks (for want of a better name), had already been discovered.

A second major event at the Hamburg congress concerned not the heavy elementary particles, the hadrons, but the lightweight particles, the best known of which is the electron.

Physicists term these lightweight particles leptons, and in recent months final doubts as to the existence of a superheavy brother of the electron, the so-called heavy lepton, which is 4,000 times heavier than the electron, have been dispelled.

With the confirmation of the heavy lepton's existence the number of leptons has probably increased from four to six, since a neutron counterpart may be presumed to exist and has been dubbed the heavy neutrino.

The existence of more than four leptons has started physicists thinking, since they tend to feel that leptons and quarks ought to be equal in number. In other words, there would seem to be more than four quarks too.

In Hamburg another American physicist, Professor Leon Lederman, provided

the first pointer to the existence of a fifth quark. This, then, was the third major discovery unveiled in Hamburg.

At the Fermi laboratories near Chicago Professor Lederman has discovered a particle that is ten times heavier than a hydrogen atom and boasts properties that can only be explained by assuming it to be a fifth quark.

Lederman's discovery has yet to be confirmed, but physicists are already drawing their conclusions. How many quarks are there, they wonder. Will their existence ever be proved individually?

If, for that matter, there are many more varieties of quark awaiting discovery, which Professor Lederman suspects is the case, will they turn out to be the smallest particles of matter or are they too made up of yet smaller particles?

These queries can only be answered with the aid of still larger research devices. Already the largest particle accelerators in use are four miles in circumference and cost hundreds of millions of Deutschmarks.

One country alone will soon no longer be able to foot the bill of basic research in this sector, although the next generation of accelerators, Petra in Hamburg and Pep in Stanford, California, will still be built under the aegis of individual countries.

Talks are, however, under way with a view to international cooperation on the next generation but one, which will be particle accelerators with a circumference of up to thirty miles.

Reiner Korbmann
(Hannoversche Allgemeine, 2 September 1977)

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One day we'll have a phone up our sleeves

For instance, Professor F. Winterberg, of the University of Nevada, suggested sending a complete self-contained community into space. In fact his proposal envisaged an artificial type of city contained in a type of saucer with a diameter of one kilometre and 50 metres long.

This type of fantastic project shows that some prophets of what's-to-come-in-the-space-travel field are barely able to free themselves from their predisposition towards gigantic undertakings.

Be this as it may, Professor Winterberg did not think his space cylinder would become a reality for another 100 or even 200 years.

Other lecturers concentrated more on finding better and more efficient ways of fuelling future spaceships.

Current chemical fuels in use enable spaceships to attain speeds which are of use only within our known solar system.

If one wanted to fly to the nearest star in the Milky Way, for instance using today's known means of propulsion, one would need hundreds of thousands of years to get there.

Among suggestions at the Berlin space conference was the use of electric propulsion units which would enable ionised gas to be propelled at extraordinarily high speed. Scientists also considered the possibilities of atomic propulsion including the fusion rocket — although it will take decades before it will be able to adequately control the fusion process in laboratories on Earth.

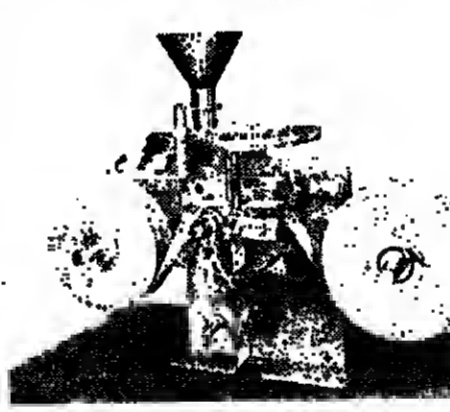
Meanwhile, space experts are already dreaming of achieving the highest speed possible in space: the speed of light.

Theoretically we already know how to attain this speed. Matter, joined with so-called anti-matter, would be transformed 100 per cent into energy and thereby provide a laser-like light beam to power rockets.

But to achieve this, all the energy available on Earth would have to be brought into play — which means that this idea will no doubt remain no more than an idea for a long time to come.


(Frankfurter Allgemeine Zeitung für Deutschland, 6 September 1977)

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